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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/800,727	03/16/2004	Atsushi Hirota	118925	1036

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EXAMINER

FIDLER, SHELBY LEE

ART UNIT	PAPER NUMBER
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2861

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	01/29/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary

Application No.

10/800,727

Applicant(s)

HIROTA, ATSUSHI

Examiner

Shelby Fidler

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 26 December 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-8 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-8 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 16 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-8 are rejected under 35 U.S.C. 102(b) as being anticipated by Takagi (US 6536880 B2).

Regarding claim 1:

Takagi discloses an ink-jet head, comprising:

a passage unit (cavity plate 10) in which a plurality of pressure chambers (pressure chambers 16) each connected to a corresponding nozzle (col. 3, lines 47-49) are arranged adjacent to each other along a plane (Fig. 3); and

an actuator unit (actuator 20) that is fixed to the passage unit (col. 3, lines 15-18) to change the volume of the pressure chambers (col. 1, lines 17-21),

wherein the actuator unit (20) includes:

a piezoelectric element (e.g. piezoelectric sheet 26) that spans a plurality of pressure chambers (Fig. 5),

a plurality of individual electrodes (drive electrodes 36) that have been sintered (col. 5, lines 9-12, 19-24) on a surface of the piezoelectric element at positions corresponding to the respective pressure chambers (col. 4, lines 13-16 and Fig. 9), and

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one or more sintered members (dummy electrodes 36') of substantially the same residual stress characteristics as the individual electrodes (col. 5, lines 7-12 show that the dummy electrodes are made of the same material and are sintered at the same time as the individual electrodes; therefore, they share substantially equal residual stress characteristics) at positions other than positions corresponding to the pressure chambers (Figs. 6 and 9) and that are, on the surface of the piezoelectric element provided with the plurality of electrodes (col. 4, lines 13-22 and Fig. 6), spaced from an outermost one of the individual electrodes with respect to an arrangement direction (longitudinal direction D1, Figs. 2 and 6) of the plurality of individual electrodes in an outward direction from the plurality of individual electrodes (Fig. 6).

Regarding claim 2:

Takagi also discloses that the sintered members (36') and the individual electrodes (36) have substantially the same residual stress characteristics relative to the piezoelectric element (col. 5, lines 7-12 shows that electrodes 36 and 36' were formed at the same time in the same way with the same material; thus their residual stresses would be substantially the same).

Regarding claim 3:

Takagi also discloses that the sintered members (36') and the individual electrodes (36) are made of the same material (col. 5, lines 7-12).

Regarding claim 4:

Takagi also discloses that the sintered members (36') and the individual electrodes (36) have substantially the same shape (both are rectangles, Fig. 6) and the same size (same thickness, Figs. 6 and 7).

Regarding claim 5:

Takagi also discloses that each of the individual electrodes (36), other than the outermost one with respect to the arrangement direction of the plurality of individual electrodes, is surrounded with corresponding ones of the individual electrodes arranged in a predetermined pattern (Fig. 6); and

wherein the outermost one of the individual electrodes with respect to the arrangement direction of the plurality of individual electrodes is surrounded with a corresponding one of the individual electrodes and a corresponding one of the sintered members arranged in substantially the same pattern as the predetermined pattern (Fig. 6).

Regarding claim 6:

Takagi also discloses that the plurality of pressure chambers (16) is arranged adjacent to each other in a matrix on the plane of the passage unit (Fig. 3);

the plurality of individual electrodes (36) are arranged adjacent to each other in a matrix on the surface of the piezoelectric element (26) at positions corresponding to the respective pressure chambers (col. 4, lines 13-16); and

a plurality of sintered members (36') are arranged adjacent to each other (adjacent in the D2 direction) so as to surround the plurality of individual electrodes arranged adjacent to each other in a matrix (Fig. 6).

Regarding claim 7:

Takagi also discloses that the actuator unit (20) also includes a common electrode (common electrode 35) that is formed, on a surface of the piezoelectric element (26) opposite to the surface provided with the individual electrodes (Fig. 7), to span the plurality of pressure chambers (Fig. 5).

Regarding claim 8:

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Takagi discloses an ink-jet head, comprising:

a passage unit (cavity plate 10) in which a plurality of pressure chambers (pressure chambers 16) each connected to a corresponding nozzle (col. 3, lines 47-49) are arranged adjacent to each other in a matrix along a plane (Fig. 3); and

an actuator unit (actuator 20) that is fixed to the passage unit (col. 3, lines 15-18) to change the volume of the pressure chambers (col. 1, lines 17-21),

wherein the actuator unit includes:

a plurality of piezoelectric elements (piezoelectric sheets 21-30) that are put in layers and cover the plurality of pressure chambers arranged adjacent to each other in a matrix (col. 4, lines 9-11 and Fig. 5),

a plurality of individual electrodes (drive electrodes 36) that have been sintered (the method of forming a device is not germane to the issue of patentability of the device itself. Therefore, this limitation has not been given patentable weight) on a surface of one of the plurality of piezoelectric elements (piezoelectric sheet 26) and are arranged adjacent to each other in a matrix at positions corresponding to the respective pressure chambers (col. 4, lines 13-16 and Fig. 9),

a plurality of sintered members (dummy electrodes 36') of substantially the same residual stress characteristics as the individual electrodes (col. 5, lines 7-12 show that the dummy electrodes are made of the same material and are sintered at the same time as the individual electrodes; therefore, they share substantially equal residual stress characteristics) at positions other than positions corresponding to the pressure chamber (Figs. 6 and 9) and that are, on the surface of the one of the plurality of piezoelectric elements (Fig. 6), arranged adjacent to each other (adjacent in the D2 direction) so as to surround the plurality of individual

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electrodes arranged adjacent to each other in a matrix (Fig. 6), the sintered members and the individual electrodes having substantially the same residual stress characteristics relative to the piezoelectric elements (col. 5, lines 7-12 shows that electrodes 36 and 36' were formed at the same time in the same way with the same material; thus their residual stresses would be substantially the same), and

a common electrode (common electrode 35) that is formed, on a surface of the one of the piezoelectric elements (piezoelectric sheet 27) opposite to the surface provided with the individual electrodes (Fig. 7), to span the plurality of pressure chambers (Fig. 5).

Response to Arguments

With regards to claims 1 and 8, applicant argues that the Takagi reference does not disclose that the dummy pattern electrodes 36' have substantially the same residual stress characteristics as the drive electrodes 36. However, please see the above rejection, which shows that the dummy electrodes and the drive electrodes are manufacturing using the same metal and during the same process. Therefore, Takagi's electrodes inherently have the same residual stresses.

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Communication with the USPTO


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shelby Fidler whose telephone number is (571) 272-8455. The examiner can normally be reached on M-F 8:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Meier can be reached on (571) 272-2149. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Shelby L. Fidler 1/18/2007

Shelby Fidler
Patent Examiner
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STEPHEN MEIER
SUPERVISORY PATENT EXAMINER